Level II CFA Exam Questions

Level II Vignette: Holly Jameson, CFA

Holly Jameson has recently started a new role as a bond analyst at Holt Investment Management, LLC, based in Farland. Her team leader has provided her with up-to-date but incomplete data on the term structure of interest rates, summarized in Exhibit 1.

Exhibit 1: Farland Treasury Bond Rates

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Maturity (years)	Spot	Forward	Par
1	2.30%	2.30%	2.30%
2			3.14%
3			4.35%

Holly has been asked to assess whether a specific treasury bond that Holt is considering recommending to its clients is fairly priced. The bond pays a 6% annual coupon, matures in three years' time, and is trading at $108.30.

In a discussion in the staff dining room shortly after she joined the firm, Holly's colleague, Doug Ross, made a confident assertion, "I really don't know how some people find bond trading difficult. For each specific maturity, spot rates are always lower than forward rates, and forward rates are always lower than YTM. So, you can always achieve a higher return by riding the yield curve. I've been doing that since my first day on the job."

Holt offers both domestic and international bonds to its clients to enable them to benefit from risk reduction through diversification. Holly has carried out some preliminary research on the Farland bond market and has found that the yield curve has an unexpected shape and does not seem to be driven by interest rate expectations.

She asks her team leader for advice, who tells her, “Things are strange in Farland. Rates are influenced simply by the supply and demand of bonds of specific maturities. Different types of investors want particular maturity bonds, and they never seem to deviate from their preferences. High demand for 5-year bonds has pushed prices up and yields down.”

Alex Allan, a bond analyst colleague of Holly, started another discussion with the group by stating, “I’m more interested in what happens to bond prices when the yield curve changes. I need to estimate how much prices will change when short-term yields increase but long-term yields stay constant.”

Question 1: The BBB-rated corporate bond being assessed by Holly is most likely:

A. Undervalued by $2.34.
B. Overvalued by $3.75.
C. Overvalued by $3.70.

Question 2: The comments made by Doug Ross are most likely:
A. Inaccurate in respect to the statement about spot rates, forward rates, and yields-to-maturity.
B. Inaccurate in respect to the statement about riding the yield curve.
C. Inaccurate in both respects.

Question 3: Holly’s team leader’s comments about interest rates in Farland most likely supports which theory of the term structure of interest rates?

A. Liquidity preference theory.
B. Segmented markets theory.
C. Local expectations theory.

Question 4: The most appropriate measure for Alex Allan to assess bond price sensitivity is:

A. Key rate duration.
B. Effective duration.
C. Macaulay duration.

Question 1

Holly must first bootstrap spot rates for years 2 and 3 from the given par yields-to-maturity. A bond trading at par must have the same coupon rate as the yield-to-maturity. Using a hypothetical 2-year par bond, the 2-year spot rate can be derived as follows:

$$100 = \frac{3.14}{1.023} + \frac{103.14}{(1+S_2)^2}$$

$$96.93 = \frac{103.14}{(1+S_2)^2}$$

$$(1+S_2)^2 = \frac{103.14}{96.93} = 1.06406$$

$$S_2 = 3.15\%$$

Likewise, the 3-year spot rate:

$$100 = \frac{4.35}{1.023} + \frac{4.35}{(1.0315)^2} + \frac{104.35}{(1+S_3)^3}$$

$$91.66 = \frac{104.35}{(1+S_3)^3}$$

$$(1+S_3)^3 = \frac{104.35}{91.66} = 1.13845$$

$$S_3 = 4.42\%$$

Having derived the relevant spot rates, Holly can now value the BBB-rated corporate bond, discounting the future cash flows using the spot rates:

$$P_0 = \frac{6}{1.023} + \frac{6}{(1.0315)^2} + \frac{106}{(1.0442)^3} = 104.60$$

The bond is trading at $108.30 and is therefore overvalued by $3.70.

Question 2

Doug's comments about the relative values of spots, forwards, and yields-to-maturity apply only when the yield curve is upward-sloping. If the yield curve is downward-sloping, spots will be higher than forwards, and forwards will be higher than yields.

Riding the yield curve describes a strategy whereby an investor will buy a bond with a maturity greater than his investment horizon and sell it before maturity. This strategy will provide higher returns than buying a bond and holding it to maturity over the same period only if the yield curve is upward sloping and its shape remains stable over the investment period. If the yield curve steepens sufficiently, then the strategy may produce losses.

Question 3

The segmented markets theory states that the shape of the yield curve is determined by varying levels of supply and demand for bonds of specific maturities, and investors only deal in bonds with their preferred maturities, regardless of yields on bonds of different maturity.

The preferred habitat theory has similar principles, but investors may be tempted to invest in bonds that are not of their preferred maturity if expected returns are attractive enough, with low prices and high yields.

Question 4

Assuming an upward-sloping yield curve as a starting point, if short-term yields increase, but long-term yields remain constant, then the yield curve will flatten. This is a non-parallel shift in the yield curve, which makes effective duration an inappropriate measure of bond price sensitivity. Key rate duration is the preferred measure for non-parallel shifts in the yield curve.

Effective duration is only suitable for measuring the sensitivity of a bond's price to parallel shifts in the yield curve. Macaulay duration measures the weighted average length of time to receive the present value of a bond's cash flows and is inappropriate in this instance.